Nanotechnology - Nanoporous; New Findings from University of Texas Austin Update Understanding of Nanoporous (Impact of Gas Adsorption of Nitrogen, Argon, Methane, and Co2 On Gas Permeability In Nanoporous Rocks)

509 words
2 December 2024
Nanotechnology Weekly
NANOWK
3849
English

2024 DEC 2 (VerticalNews) -- By a News Reporter-Staff News Editor at Nanotechnology Weekly -- Fresh data on Nanotechnology - Nanoporous are presented in a new report. According to news originating from Austin, Texas, by VerticalNews correspondents, research stated, "Gas adsorption on the surface of nanoporous rocks is an important process that occurs in many applied scenarios such as shale gas production or CO2 enhanced gas recovery or storage. While there are few theoretical considerations on the effect of gas adsorption on permeability, a systematic laboratory investigation of the impact of gas adsorption on gas flow and permeability is still lacking."

Funders for this research include Aramco Houston Research Center, STARR (State of Texas Advanced Oil and Gas Resource Recovery), Mudrock Systems Research Laboratory (MSRL) of the **Bureau of Economic Geology** at UT Austin.

Our news journalists obtained a quote from the research from the University of Texas Austin, "In this paper, permeability of four adsorptive gases, i.e., nitrogen, argon, methane, and carbon dioxide, was measured, along with helium permeability, for two nanoporous rock samples that have high and low total organic carbon (TOC) content, respectively. The measurements were conducted at a range of pore pressures from 150 to 1500 psi (1.03-10.34 MPa). Gas adsorption isotherms were also measured at the same conditions. A mathematical model that considers adsorption with specific boundary conditions for the experimental setup was used for data analysis. The results show that gas adsorption causes larger drop in pressure decay and greater retardation in pressure equilibrium. However, the reduction of permeability relative to helium (25%-46%) is similar for gases with different levels of adsorption, indicating the occurrence of single-layer adsorption for these gases. Comparison between the two samples further supports the concept of single-layer adsorption and signifies the impact of pore size on the permeability reduction due to adsorption."

According to the news editors, the research concluded: "These new findings deepen the fundamental understanding and provide important clarification on the effect of gas adsorption on gas flow and permeability in nanoporous rocks."

This research has been peer-reviewed.

For more information on this research see: Impact of Gas Adsorption of Nitrogen, Argon, Methane, and Co2 On Gas Permeability In Nanoporous Rocks. Gas Science and Engineering, 2024;131. Gas Science and Engineering can be contacted at: Elsevier, Radarweg 29, 1043 Nx Amsterdam, Netherlands.

The news correspondents report that additional information may be obtained from Sheng Peng, University of Texas Austin, Jackson School of Geosciences, Bur Econ Geol, Austin, TX 78713, United States. Additional authors for this research include Tongwei Zhang, Harun Ates, Shannon L. Eichmann and Anuj Gupta.

Keywords for this news article include: Austin, Texas, United States, North and Central America, Alkanes, Argon, Emerging Technologies, Methane, Nanoporous, Nanotechnology, Nitrogen, University of Texas Austin.

Document NANOWK0020241202ekc20010b

